Pest Alert

United States
Department of Agriculture
Forest Service
Northeastern Area
State and Private Forestry
NA–PR–01–11
Revised April 2012

Eastern White Pine Needle Damage

Eastern white pine is widespread and highly valued in New England. During the summer of 2010, white pine needle damage was frequently observed throughout New England. Symptoms consisted of yellow and brown discoloration of 1-year-old needles (figures 1 and 2) on both mature trees and regeneration. Trees most severely affected were growing at the edge of bodies of water; in wet areas; and on dry, steep slopes.

This damage has been attributed to two foliar diseases—Canavirgella needle cast caused by the fungus *Canavirgella banfieldii* and brown spot needle blight caused by the fungus *Mycosphaerella dearnessii*. Wet spring weather favors spore formation, dispersal, and infection by both fungi. It is likely that wet spring weather during several consecutive years was conducive to an outbreak of one or both of these diseases (figure 3).

Late spring frost in 2010 may have also contributed to symptom development, further complicating diagnoses. Needle discoloration appeared suddenly in late May 2010, shortly after several episodes of below-freezing temperatures.

Both fungi cause similar symptoms. Lesions in current-year needles begin as spots that develop into brown and yellow bands that continue to expand, causing death to the distal part of the needle (figure 2). The extent of damage for affected needles varies. The bases of needles can remain green, and not all needles in a fascicle may be affected. Dead, brown needle tips can break off, causing tree crowns to look thin a year after initial infection (figure 4). Trees commonly shed needles that are entirely infected, with substantial needle drop occurring in June.

The fungi can be told apart by their spore-producing structures, which can be seen with the naked eye or with a hand lens. *C. banfieldii* produces elongated (15-52 mm), black sexual fruiting structures (figure 5). In contrast, *M. dearnessii* produces small (< 3 mm), black fruiting structures (figure 6). These fungi can also be differentiated by the shape and color of their spores.

The pathogenic fungus *C. banfieldii* was first described in 1996. Its symptoms had been observed as early as 1908, but had been attributed to other fungi and later, to ozone damage. Needles infected by *C. banfieldii* are often colonized by other secondary fungi, further complicating disease diagnoses. Canavirgella needle cast occurs throughout the range of eastern white pine, but damage has typically been limited to fewer than 0.1 percent of trees. Damage has been consistently observed in Maine since 2006. Mortality caused by this disease has not been documented, and the effects of repeated defoliation caused by the fungus on white pine are unknown. Control measures have not been investigated.

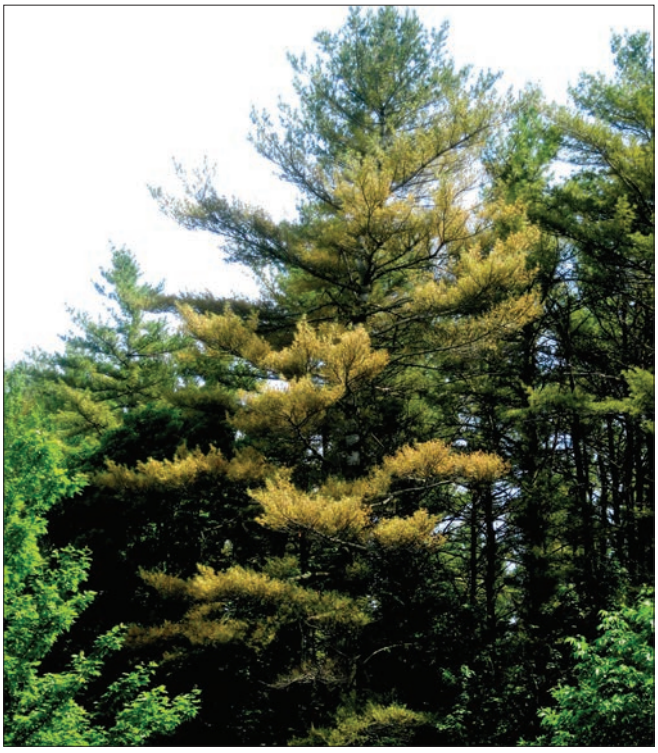

Figure 1. Mature eastern white pine with yellowing needles.

Figure 2. One-year-old needles with damaged tips on eastern white pine regeneration.

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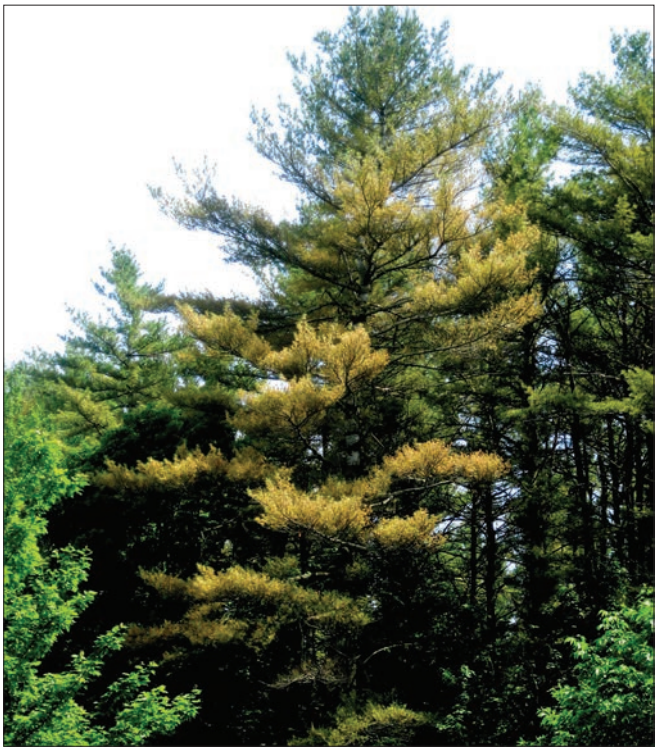

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Figure 3. Aerial photograph of Vermont forests with damaged eastern white pines.

Figure 4. Damaged eastern white pines with thinning crowns.

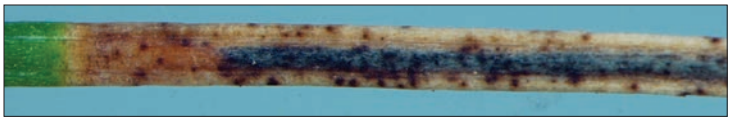

Figure 5. Infected pine needle with a spore-producing structure of the pathogen *Canavirgella banfieldii*.

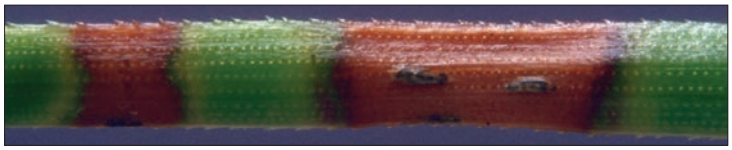

Figure 6. Infected pine needle with a spore-producing structure of the pathogen *Mycosphaerella dearnessii*.

Brown spot needle blight is widely distributed throughout the world and affects many pine species. It damages and can kill nursery trees, regeneration, and young tree plantations. Strategies to control this disease in nursery settings include spraying with protectant fungicides, increasing spacing among plants to improve ventilation, and avoiding pruning during wet spring and fall weather when spores are present. Using fungicides on forest trees is not recommended.

During 2011, Forest Health State Cooperators from Maine, New Hampshire, and Vermont sampled white pine stands that had foliar damage the prior year. Personnel at the U.S. Forest Service Durham Field Office processed the white pine samples and diagnosed the pathogens involved.

The needles were infected with *M. dearnessii* and *C. banfieldii* as well as *Bifusella linearis*, another pathogen that causes needle cast disease. These three pathogens were present at the same site, and more than one pathogen was found infecting the same tree. White pine samples collected in May contained long, black hysterothecia formed by *B. linearis* and *C. bandfieldii* along with browning of the distal parts of the needles. *M. dearnessii* was the most frequently observed and widely distributed pathogen; this was also the pathogen that was most consistently associated with chlorosis and defoliation in early July.

References:

Merrill, W.; Wenner, N. G.; Dreisbach, T. A. 1996.
Canavirgella banfieldii gen. and sp. nov.: a needlecast fungus on pine. Canadian Journal of Botany. 74(9): 1476-1481.

Sinclair, W. A.; Lyon, H. H. 2005. Diseases of trees and shrubs. 2d ed. Ithaca, NY: Cornell University Press. 660 p.

Photographs:

Figures 1, 2: William D. Ostrofsky, Maine Forest Service
Figures 3, 4: Barbara Burns, Vermont Department of Forests, Parks & Recreation
Figure 5: Sharon Douglas, The Connecticut Agricultural Experiment Station
Figure 6: Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org

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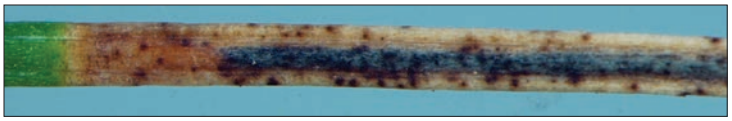
Figure 4. Damaged eastern white pines with thinning crowns.



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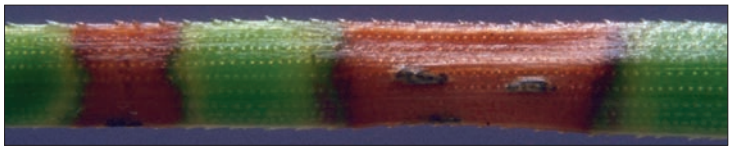

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